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10/815,033	03/31/2004	Christophe J. Dorrer	9-10-7-9	7803

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WALL & TONG, LLP/
ALCATEL-LUCENT USA INC.
595 SHREWSBURY AVENUE
SHREWSBURY, NJ 07702

EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/815,033	DORRER ET AL.	
	Examiner	Art Unit	
	LI LIU	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-10,12-14,19-23,25,26,28 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *2-8,10,12-14,19-23,26 and 29* is/are allowed.

6)☒ Claim(s) *9,25 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *4/14/2009*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 4/14/2009 is being considered by the examiner.

Response to Arguments

2. Applicant's arguments, filed on 7/14/2009, with respect to claims 2-8, 10, 12-14, 19-23, 26 and 29 have been considered and are persuasive. The rejection of claims 2-8, 10, 12-14, 19-23, 26 and 29 has been withdrawn.

Applicant's arguments with respect to claims 9, 25 and 28 have been fully considered but they are not persuasive.

1). Applicant's argument – Heismann does not teach or suggest a Mach-Zehnder modulator having a polarization rotation device in at least one arm and configured to provide simultaneous polarization alternation and optical data encoding by phase shift keying, as recited in Applicants' independent claim 9. The fact that the Office Action asserts that Heismann can or may be modified to perform simultaneous polarization alternation and phase shift keying, does not establish such a teaching in the reference. To the contrary, the phase modulating in Heismann is not for the purpose of data encoding but is a sinusoidal modulation. (See Heismann, paragraph beginning on p. 312 and ending on p. 313). Consequently, Heismann also fails to teach or to suggest alternating the polarization of every other bit simultaneous with the step of encoding the

optical source signal to produce an APol-PSK signal, wherein said alternating is performed by the Mach-Zehnder modulator, as further recited in Applicants' claim 9.

Examiner's response – First, Heismann clearly discloses a Mach-Zehnder modulator having a polarization rotation device in at least one arm (the 90 degree Rotated PMF in Figure 2).

As disclosed by Heismann, the polarization scrambler "is capable of generating any desired combination of optical phase and polarization modulation" (page 311, ABSTRACT). That is, the scrambler is used to change the phase and polarization of the input optical pulse.

As shown in Figure 2 and Equations (5), (7) and (10) etc., page 313-314, the phase difference between the two arms in Figures 2a or 2b is introduced by the phase modulation signal applied to the two arms. After the phase modulation, one arm is rotated 90 degree to make the polarization states of the components in the two arms orthogonal. And by varying the two drive voltage amplitudes and the relative drive phase, independently of each other, Heismann "can not only produce any desired combination of polarization and phase modulation, but we may also control the phase relationship between the induced polarization and phase modulation" (page 314, right column).

That is, Heismann discloses a device that provides phase modulation and polarization modulation. Although Heismann does not expressly state that the device is "for the purpose of data encoding", the device is fully capable of providing simultaneous polarization alternation and optical data encoding. Since just "by varying the two drive

voltage amplitudes and the relative drive phase" any desired combination of polarization and phase modulation can be generated, it is obvious to one skilled in the art to use Heismann's polarization/phase modulator for polarization alternation and optical data encoding.

Chraplyvy et al teaches to precode the electronic signal by phase shift keying and generate optical phase shift keying signal; and Hodzic teaches "alternating the polarization of every other bit" and that the signals with orthogonal polarization between adjacent bits cause significant improvement of system performance, and the alternative polarization modulation format significantly improves the maximum input power and results also in suppression of intrachannel effects; and the alternate polarization format remains the best choice modulation format (page 155 left column). Heismann provides phase/polarization modulator with a high-speed, low insertion loss and low driving power; and the device can produce any desired combination of polarization and phase modulation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the Mach-Zehnder modulator as taught by Heismann et al to the system of Chraplyvy et al and Hodzic et al so that a high speed APol-PSK can be generated with a single modulator which has a simple structure and low insertion loss, and provides simultaneous phase modulation and polarization alternation.

2). Applicant's argument – "Furthermore, Applicants submit that Heismann may not properly be combined with Chraplyvy and Hodzic because Heismann teaches a polarization scrambler, which is generally a device that is used to depolarize a launched

optical information signal. (See Heismann col. 1 lines 43-47). Thus, Heismann is inherently incompatible with the embodiments of Applicants' claims (claim 12 in particular), in which the transmitted signal should have two substantially orthogonal polarizations states (i.e., alternating polarizations). Moreover, Heismann would not be suitable for its intended purpose if modified to simultaneously PSK encode data and alternate the polarization of every other bit because the device or method would no longer produce effective polarization scrambling. See MPEP 2143.01(V)".

Examiner's response – As discussed above, Heismann's device "is capable of generating any desired combination of optical phase and polarization modulation". Heismann never state that the device can only be used as a scrambler. As disclosed by Heismann, just by varying the two drive voltage amplitudes and the relative drive phase, independently of each other, the device can produce any desired combination of polarization and phase modulation. Thus, Heismann is inherently "compatible with the embodiments of Applicants' claims". Also, Heismann never state that "if modified to simultaneously PSK encode data and alternate the polarization of every other bit", the device also must "produce effective polarization scrambling". Heismann's device is for optical phase and polarization modulation, it is obvious to one skilled in the art that Heismann's device can be used for different purposes.

Actually, the system the applicant uses for polarization alternation/phase encoding is the same as that disclosed by Heismann: Figure 4B of applicant is the same as the Figure 2(a) of Heismann, and Figure 4C of applicant is the same as the Figure 2(b) of Heismann (also refer to applicant another publication: Xie et al "Suppression of

Intrachannel Nonlinear Effects With Alternate-Polarization Format", Journal of Lightwave Technology, Vol. 22, No. 3, March 2004, pages 806-812. Figures 3(b) & (c) of Xie are exactly the same as the Figure 2(a) & (b) of Heismann).

Heismann can "properly be combined with Chraplyvy and Hodzic", and Heismann is inherently "compatible with the embodiments of Applicants' claims".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 9, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chraplyvy et al (US 2003/0007216) in view of Hodzic et al (Hodzic et al: "Improvement of System Performance in N x 40-Gb/s WDM Transmission Using Alternate Polarizations", IEEE Photonics Techmology Letters, Vol. 15, No. 1, Jan 2003, pages 153-155) and Heismann et al (Heismann et al: "High-Speed Polarization Scrambler with Adjustable Phase Chirp", IEEE Journal of Selected Topic in Quantum Electronics, Vol. 2, No. 2, June 1996, page 311-318).

1). With regard to claim 9, Chraplyvy et al discloses a method of PSK transmission comprising the steps of:

providing a coherently polarized optical source signal (Figure 1, the continue wave distributed feedback laser, CW-DFB laser, generates a coherently polarized

optical signal) to the arms of a Mach-Zehnder modulator (the optical signal is provided to the arms the phase modulator 105, which is a Mach-Zehnder modulator, via a pulse carver 103, [0023]),

encoding the optical source signal by phase shift keying to generate a phase encoded signal (Figures 1 and 2, the optical source signal is encoded by phase shift keying to generate a phase encoded signal, [0021]-[0024], Figure 2d shows the PSK signal), wherein said phase shift keying is performed by driving the Mach-Zehnder modulator with an electronic data signal (the electronic signal from the Data In 111 drives the Mach-Zehnder phase modulator 105 to generate the PSK signal, [0023] and [0024]); and

But, Chraplyvy et al does not disclose: an APol-PSK transmission, and the Mach-Zehnder modulator has a polarization rotation device in at least one arm and configured to provide simultaneous polarization alternation and optical data encoding by phase shift keying; and alternating the polarization of every other bit simultaneous with the step of encoding the optical source signal to produce an APol-PSK signal, wherein said alternating is performed by the Mach-Zehnder modulator.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder, modulating the input optical signal by the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization modulator in

Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the alternate polarization format remains the best choice modulation format (page 155 left column).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polarization alternation as taught by Hodzic et al to the system of Chraplyvy et al so that a APol-PSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

But, the combination of Chraplyvy et al and Hodzic et al teaches two modulators: one for phase modulation and anther for polarization modulation. Chraplyvy et al and Hodzic et al do not expressly teach a single Mach-Zehnder modulator having a

polarization rotation device in at least one arm to provide simultaneously polarization alternation and optical data encoding.

However, Heismann et al, in the same field of endeavor, teaches a Mach-Zehnder modulator having a polarization rotation device (the 90 degree Rotated PMF in Figure 2) in at least one arm; and the Mach-Zehnder modulator can provide simultaneous polarization alternation and optical phase modulation (Figure 2, equations (5), (7) and (10) etc., page 313-314).

The phase difference between the two arms in Figures 2a or 2b is introduced by the phase modulation signal applied to the two arms. After the phase modulation, one arm is rotated 90 degree to make the polarization states of the components in the two arms orthogonal. The output Jones vectors of the device in Figure 2(a) is shown in Equations (5) and (10). The functional operation of the polarization alternator in Figure 2(a) is <u>similar to that of a phase modulator followed by a variable polarization rotator</u>. Heismann et al teaches that by varying the two drive voltage amplitudes and the relative drive phase, <u>any desired combination of polarization and phase modulation can be produced</u>, and the phase relationship between the induced polarization and phase modulation can also be controlled (page 314, right column).

Since Chraplyvy et al teaches to precode the electronic signal by phase shift keying, and the Mach-Zehnder modulator of Heismann can generate any desired phase modulation and polarization state. By combination of Chraplyvy et al and Hodzic and Heismann, the Mach-Zehnder modulator of Heismann can be driven according to the

precoded electronic signal of the phase shift keying to provide simultaneously polarization alternation and phase encoding and generate the APol-PSK signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the Mach-Zehnder modulator as taught by Heismann et al to the system of Chraplyvy et al and Hodzic et al so that an integrated monolithic modulator can be obtained and a high speed APol-PSK can be generated with a single modulator, and a simple structure system with simultaneous phase modulation and polarization alternation can be utilized, and system cost can be decreased.

2). With regard to claim 25, Chraplyvy et al discloses an optical transmitter (Figures 1 and 2) for PSK transmission comprising:

an optical source (the DFB Laser 101 in Figure 1);

a Mach-Zehnder (MZ) modulator device optically coupled to the optical source (the phase modulator 105, which is a Mach-Zehnder modulator coupled to the optical source via the pulse carver 103, [0023]); and

drive circuitry coupled to the MZ modulator device to drive the MZ modulator (Figure 1, the electrical signal from the Data Input 101 to drive the phase modulator, that is, a drive circuitry is inherently present in the system so to drive the Mach-Zehnder to generate a PSK signal, [0023] and [0024]) to provide optical data encoding of an optical signal using phase shift keying to generate a PSK signal (Figures 1 and 2, the optical source signal is encoded by phase shift keying to generate a phase shift keying signal, [0021]-[0024], Figure 2d shows the PSK signal).

But, Chraplyvy et al does not disclose: an APol-PSK transmitter, and the Mach-Zehnder modulator has a polarization rotation device in one arm and to simultaneously provide polarization alternation and optical data encoding of the optical signal using phase shift keying to generate an APol-PSK signal, wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder, modulating the input optical signal by the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization modulator in Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the

alternate polarization format remains the best choice modulation format (page 155 left column).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polarization alternation as taught by Hodzic et al to the system of Chraplyvy et al so that a APol-PSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

But, the combination of Chraplyvy et al and Hodzic et al teaches two modulators: one for phase modulation and anther for polarization modulation. Chraplyvy et al and Hodzic et al do not expressly teach a <u>single</u> Mach-Zehnder modulator having a polarization rotation device in at least one arm to provide simultaneously polarization alternation and optical data encoding.

However, Heismann et al, in the same field of endeavor, teaches a Mach-Zehnder modulator having a polarization rotation device (the 90 degree Rotated PMF in Figure 2) in at least one arm; the Mach-Zehnder modulator can provide simultaneous polarization alternation and optical phase modulation (Figure 2, equations (5), (7) and (10) etc., page 313-314); wherein input signals to both arms of the Mach-Zehnder modulator have polarizations that are the same (0 degree linear input SOP in Figure 2).

The phase difference between the two arms in Figures 2a or 2b is introduced by the phase modulation signal applied to the two arms. After the phase modulation, one arm is rotated 90 degree to make the polarization states of the components in the two

arms orthogonal. The output Jones vectors of the device in Figure 2(a) is shown in Equations (5) and (10). The functional operation of the polarization alternator in Figure 2(a) is <u>similar to that of a phase modulator followed by a variable polarization rotator</u>. Heismann et al teaches that by varying the two drive voltage amplitudes and the relative drive phase, <u>any desired combination of polarization and phase modulation can be produced</u>, and the phase relationship between the induced polarization and phase modulation can also be controlled (page 314, right column).

Since Chraplyvy et al teaches to precode the electronic signal by phase shift keying, and the Mach-Zehnder modulator of Heismann can generate any desired phase modulation and polarization state. By combination of Chraplyvy et al and Hodzic and Heismann, the Mach-Zehnder modulator of Heismann can be driven according to the precoded electronic signal of the phase shift keying to simultaneously provide polarization alternation and phase encoding to generate the APol-PSK signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the Mach-Zehnder modulator as taught by Heismann et al to the system of Chraplyvy et al and Hodzic et al so that an integrated monolithic modulator can be obtained and a high speed APol-PSK can be generated with a single modulator, and a simple structure system with simultaneous phase modulation and polarization alternation can be utilized, and system cost can be decreased.

3). With regard to claim 28, Chraplyvy et al discloses an optical transmission system (Figures 1 and 2) for PSK transmission comprising:

an optical source (the DFB Laser 101 in Figure 1),

a modulator means (the PSK Modulator 105 in Figure 1) to provide optical data encoding by phase shift keying to generate an PSK signal (the electronic signal from the Data In 111 drives the Mach-Zehnder phase modulator 105 to generate the PSK signal, [0023] and [0024]; the optical source signal output from the MZ phase modulator is encoded by phase shift keying, [0021]-[0024], Figure 2d shows the PSK signal).

But, Chraplyvy et al does not disclose: an APol-PSK transmission, and the Mach-Zehnder modulator has a polarization rotation device to provide simultaneous polarization alternation and optical data encoding by phase shift keying to generate an APol-PSK signal.

However, it is well known in the art that the alternate polarization format with adjacent bits have orthogonal polarization can be used to significantly reduce the intrachannel nonlinear distortion. Hodzic teaches such a method and system to generate APol-RZ signal (alternate polarization return-to-zero signal) (Figure 1). Hodzic et al teaches a RZ coder, modulating the input optical signal by the RZ electronic data signal, alternating the polarization of the RZ optical signal using a modulator (polarization modulator in Figure 1) such that successive optical bits have substantially orthogonal polarizations to generate an APol-RZ signal.

Hodzic discloses that the APol-RZ signals with orthogonal polarization between adjacent bits cause significant improvement of system performance through suppression of non-linear effects compared with RZ and NRZ format, the APol-RZ modulation format significantly improves the maximum input power, shows 7-10 dB

improvement compared to RZ and NRZ format, the alternate polarization of adjacent bits reduces the power transfer between adjacent bits resulting also in suppression of intrachannel effects; and the APol-RZ possesses better PMD characteristics than RZ and NRZ, has better dispersion tolerance; the maximum transmission distance can be enhanced with factor of 2 by using this modulation method. Hodzic et al teaches that the alternate polarization format remains the best choice modulation format (page 155 left column).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polarization alternation as taught by Hodzic et al to the system of Chraplyvy et al so that a APol-PSK modulation format can be obtained, and the intrachannel nonlinear distortion can be reduced, and system performance can be significantly enhanced, and the transmission distance can be significantly increased.

But, the combination of Chraplyvy et al and Hodzic et al teaches two modulators: one for phase modulation and anther for polarization modulation. Chraplyvy et al and Hodzic et al do not expressly teach a <u>single</u> Mach-Zehnder modulator having a polarization rotation device to provide simultaneous polarization alternation and optical data encoding.

However, Heismann et al, in the same field of endeavor, teaches a Mach-Zehnder modulator having a polarization rotation device (the 90 degree Rotated PMF in Figure 2); the Mach-Zehnder modulator can provide simultaneous polarization

alternation and optical phase modulation (Figure 2, equations (5), (7) and (10) etc., page 313-314).

The phase difference between the two arms in Figures 2a or 2b is introduced by the phase modulation signal applied to the two arms. After the phase modulation, one arm is rotated 90 degree to make the polarization states of the components in the two arms orthogonal. The output Jones vectors of the device in Figure 2(a) is shown in Equations (5) and (10). The functional operation of the polarization alternator in Figure 2(a) is <u>similar to that of a phase modulator followed by a variable polarization rotator</u>. Heismann et al teaches that by varying the two drive voltage amplitudes and the relative drive phase, <u>any desired combination of polarization and phase modulation can be produced</u>, and the phase relationship between the induced polarization and phase modulation can also be controlled (page 314, right column).

Since Chraplyvy et al teaches to precode the electronic signal by phase shift keying, and the Mach-Zehnder modulator of Heismann can generate any desired phase modulation and polarization state. By combination of Chraplyvy et al and Hodzic and Heismann, the Mach-Zehnder modulator of Heismann can be driven according to the precoded electronic signal of the phase shift keying to provide simultaneously polarization alternation and phase encoding and generate the APol-PSK signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the Mach-Zehnder modulator as taught by Heismann et al to the system of Chraplyvy et al and Hodzic et al so that an integrated monolithic modulator can be obtained and a high speed APol-PSK can be generated

with a single modulator, and a simple structure system with simultaneous phase modulation and polarization alternation can be utilized, and system cost can be decreased.

Allowable Subject Matter

5. Claims 2-8, 10, 12-14, 19-23, 26 and 29 allowed.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Monday-Friday, 8:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. L./
Examiner, Art Unit 2613
October 15, 2009

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613